touch dimmer

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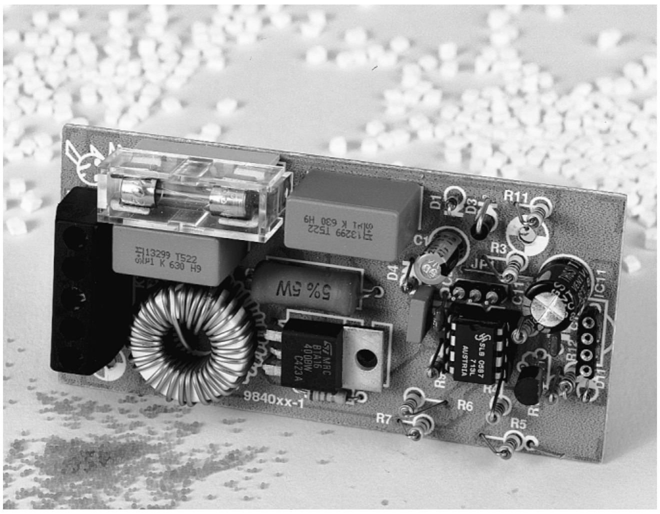
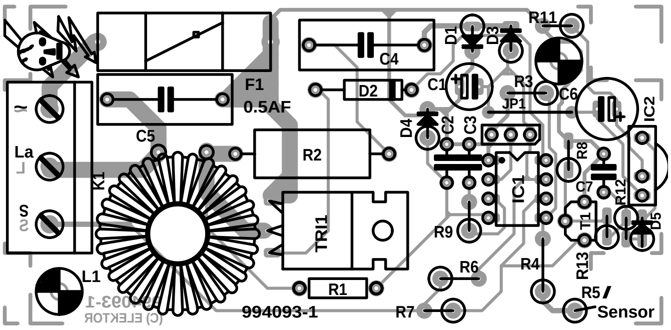
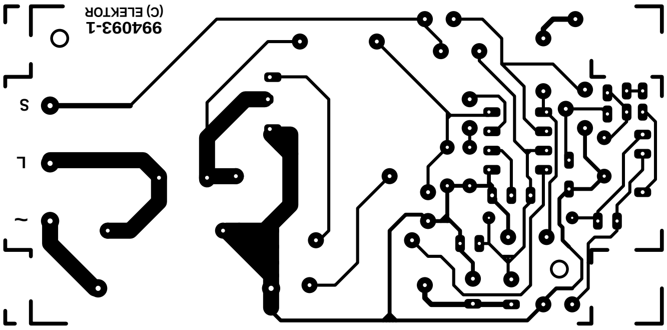






L. Lemmens

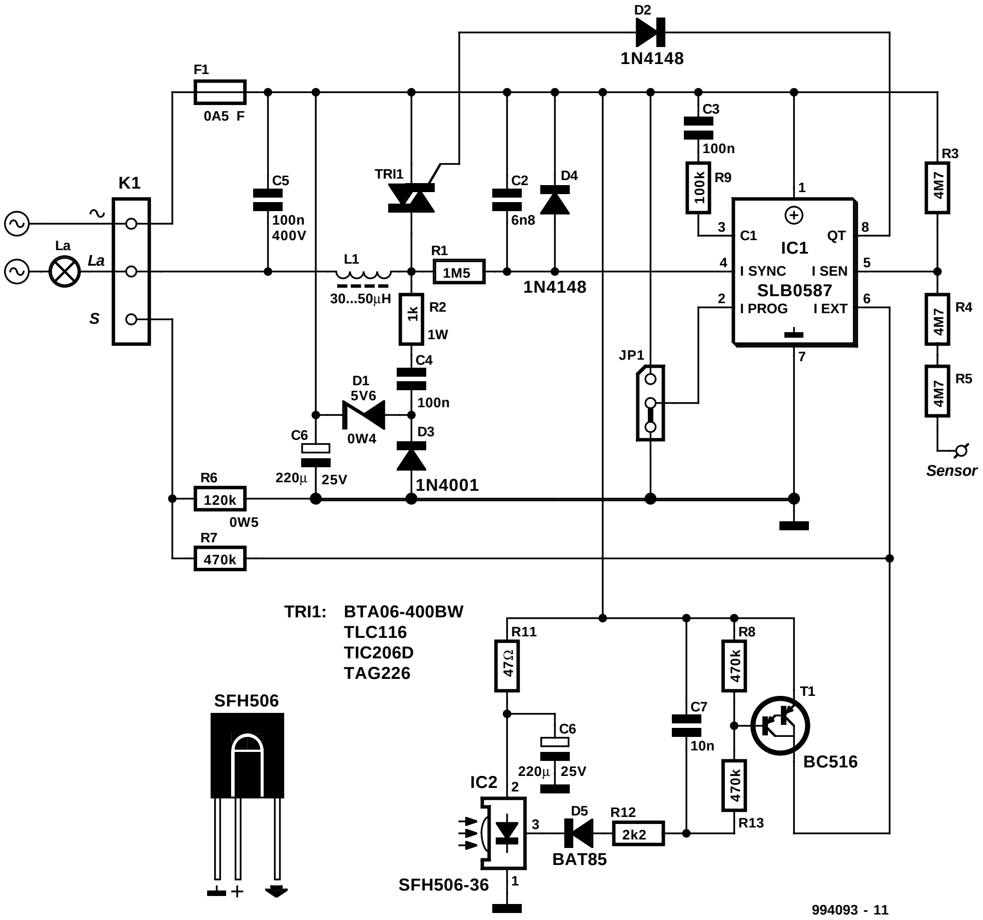
The dimmer is suitable not only for normal domestic lighting, but also for dimming halogen lamps (and other inductive loads).

The dimmer is based on a Siemens Type SLB0587, a circuit specially designed for this kind of application, and to which has been added an infra-red remote control. This remote control was published in the July/August 1998 issue of this magazine.

In the circuit diagram, the series network R_2-C_4-D_1 provides a direct voltage of 5 V directly from the mains to power IC_1. The IC is also in sync with the mains voltage via resistor R_1 and capacitor C_2. The actual phase gating is effected by triac Tri_1, whose gate is linked to pin 8 (QT) of IC_1 via diode D_2. The phase-locked loop (PLL) of the IC is synchronized with the mains frequency via capacitor C_3 and resistor R_3.

The touch sensor that enables a domestic light to be dimmed consists of three 4.7 MΩ resistors, R_3–R_5. These high resistance values make touching the sensor harmless. The output of the sensor is applied to pin 5 (I_{SEN}) of IC_1. Since in some cases it is handy to control the circuit with a push-button switch, this may be connected between S and La on connector K_1.

The IC also has an input I_{EXT}, which is for use with the optional infra-red remote control that is based on IC_2, a Type SFH506-36. This circuit picks up the signal from the sender and converts it into a control signal for IC_1 via a network that comprises among others, T_1 and R_7. The operation of the



dimmer is determined by jumper JP_1. When this is left open, the dimmer will always start with the brightness with which it was switched off. Each time the dimmer is started, the direction in which it is controlled is reversed.

When the jumper is placed to connect pin 2 of IC_1 to C_3, the dimmer always starts at maximum brightness. When the jumper is placed in the position shown in the circuit diagram, the dimmer always starts at minimum brightness.

The dimmer is best built on the printed-circuit board shown, which is available through our Readers Services (see towards the end of this magazine).

It cannot be emphasized too strongly to bear in mind that the circuit carries potentially lethal mains voltages. Only connect the dimmer to the mains once it has been completed and built into an insulated or plastic case. If the infra-red remote control is not used, IC_2 and T_1 and associated components, except R_7, may be omitted.

[994093]

Parts list

Resistors:
R_1 = 1.5 MΩ
R_2 = 1 kΩ, 1 W
R_3–R_5 = 4.7 MΩ
R_6 = 120 kΩ, 0.5 W
R_7, R_8, R_{13} = 470 kΩ
R_9 = 100 kΩ
R_{11} = 47 Ω
R_{12} = 2.2 kΩ

Capacitors:
C_1 = 47 µF, 16 V, radial
C_2 = 0.0068 µF
C_3, C_4 = 0.1 µF, 630 V
C_5 = 0.1 µF, 400 V
C_6 = 220 µF, 25 V, radial
C_7 = 0.01 µF

Inductors:
L_1 = 30–50 µH, 3 A

Semiconductors:
D_1 = zener 5.6 V, 400 mW
D_2, D_4 = 1N4148
D_3 = 1N4001
D_5 = BAT85
T_1 = BC516

Integrated circuits:
IC_1 = SLB0587 (Siemens)
IC_2 = SFH506-36

Miscellaneous:
JP_1 = 3-way jumper
K_1 = 3-way connecting strip for board mounting, pitch 7.5 mm
F_1 = fuse holder with 0.5 A (F) fuse
PC_1 = PCB pin
Tri_1 = BTA06-400BW or TIC206D or TAG226
PCB Order no. 994093 (see Readers Services towards the end of this magazine)